

U.S. Department of
Commerce
Maurice H. Stans,
Secretary

National Bureau of
Standards
A.V.Astin,
Director

Certificate

Standard Reference Material 3200

Secondary Standard Magnetic Tape-Computer

Amplitude Reference

This Standard Reference Material is intended for use in the signal amplitude calibration of computer tape recording and reproducing systems. It is defined as a Secondary Standard Magnetic Tape-Computer Amplitude Reference. It consists of 600-ft lengths of 112 in wide unrecorded magnetic tapes wound on 8 1/2 in diam precision reels. The material will consist of oriented ferromagnetic oxide particles dispersed in a suitable polymeric binder material that has been uniformly coated over the surface of a flexible polyester or equivalent base material.

The National Bureau of Standards will maintain in repository a Master Standard Magnetic Tape-Computer Amplitude Reference that will be used periodically to calibrate selected "Working" Standard Magnetic Tapes. These selected tapes will be used to calibrate the instrumentation that will be used for measuring and documenting the performance of the Secondary Standard Magnetic Tapes.

The Secondary tapes will be calibrated in terms of the 100 percent signal amplitude level whose absolute value is derived from the NBS Master Standard Magnetic Tape. Each Secondary tape will be calibrated at the recording densities of 200, 556, 800 and 3200 flux reversals per inch (FRPI).

The criteria for the selection of a tape as a Secondary Standard Magnetic Tape-Computer Amplitude Reference are based upon the signal amplitude uniformity from each NBS test track and the proximity of these signal amplitudes to that of the NBS Master tape. The NBS test tracks are tracks 2, 5 and 8 whose locations are given in USASI Document X3.22-1967. The criteria are as follows:

1. The maximum variation in average signal amplitude along each test track is limited to 4 percent over the entire length of tape.
2. The maximum variation in the instantaneous track-to-track average signal amplitude is limited to 3 percent over the entire length of tape.
3. The absolute value of the average signal amplitude reproduced from each test track is within 10 percent of the NBS Master Standard Magnetic Tape-Computer Amplitude Reference.

The average signal amplitude measurements are performed with the NBS signal averaging system. All signal amplitude measurements are made on a first read-after-write pass on the tapes. The tapes have been bulk A.C. erased prior to recording and the record current is set to a saturation level described in the associated documents.

Washington, D.C. 20234
March 17, 1969

W. Wayne Meinke, Chief,
Office of Standard Reference Materials

The following documentation accompanies each Secondary tape.

- a. Two sets of saturation curves of record current I_w versus the reproduce head output voltage e_o for the recording densities. One set is obtained from the individual Secondary Standard Magnetic Tape and the other is obtained from the NBS Master Standard Magnetic Tape. The peak value of e_o and its associated saturation current level I_w is marked on every curve.
- b. Four 6-track strip chart recordings of the output signal made at the recording densities of 200, 556, 800 and 3200 FRPI. The information on 3 of these 6-pen tracks consists of the peak signal amplitudes reproduced from the tape by the NBS test tracks. The other 3-pen tracks show the average values of these peak signal amplitudes taken over intervals of approximately 0.270 seconds. The signals are recorded on the Secondary tape at the saturation current level marked on the curves described in (a) above.
- c. The description of the measurement system including the record, the signal peak reading and signal averaging system, and the use of the curves and charts described in (a) and (b) above.

The data provided with each Secondary Standard Magnetic Tape-Computer Amplitude Reference is derived using the NBS measurement system. The National Bureau of Standards cannot guarantee the repeatability of the test data unless the signal amplitude measurements are performed on an equivalent system and under similar NBS laboratory conditions.

The description of the total system including the record, the signal peak reading and signal averaging systems, and the use of the curves described in (a) and (b) are given in NBS Miscellaneous Publication 260-18.

The development of the measuring system and the performance of the measurements leading to the calibration of these Secondary Standard Magnetic Tapes-Computer Amplitude Reference was performed by S. B. Geller, P. A. Mantek and N. G. Cleveland (IBM Research Associate). This certificate was prepared by S. B. Geller.